NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

BUREAU OF BRIDGE DESIGN

BDM CHAPTER 2 - REVISION HISTORY

Date of Revision	Action	Location of Change	Revision Description	Background
4/1/2016	Section 2.7 Replace all pages.	Section 2.7.5, page 2.7-10	2) Checking Hydrolic Data: Revised a) Flood Insurance and Flood plain Studies: **To:** *• Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS and maps).* *o NH GRANIT Flood Insurance Study. This site is considered NH's "official" DFIRM repository and allows users to view the original FEMA flood maps in pdf as well as access other flood information specific to NH. This site also contains the flood insurance studies themselves as well as other backup information. The flood insurance studies are available at:* *http://www.granit.unh.edu/dfirms/index.html* *o New Hampshire GRANITView II web mapping application is available at :* *http://www.granit.unh.edu/data/onlinemapservices/mapservicesoverview.html* *This is a web based GIS application which allows you to view FEMA's flood insurance rate maps and overlay other GIS data layers such as water resources, roads, conservation lands, aerial photography, topography, etc. all on the same map* *o FIS reports and maps for NH can be found on the FEMA web site at: https://msc.fema.gov/portal. Hit on "Search All Products" to download the FIS reports.* *• USGS Flood Reports* *o Open file reports by the USGS have been developed, and in some cases, are available for download at:* *http://water.usgs.gov/floods/reports/index.html* **From:** ~~• Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS).~~ ~~o FIS reports for NH can be found at: http://www.granit.sr.unh.edu/ or the FEMA web site (see references for link).~~ ~~• USGS Flood Reports~~ ~~o Open file reports by the USGS have been developed, and in some cases, are available for download at: http://water.usgs.gov/floods/reports/index.html~~	The link to the FEMA reports changed. Also added additional resource information: NH GRANITView web mapping.
4/1/2016	Chapter 2 References, Replace all pages.	page 2R-1, 2	Updated links for FEMA and NH GRANIT, NH Staatewide GIS Clearinghouse.	

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3/11/2016	Section 2.4 Replace all pages.	Section 2.4.6, Page 2.4-11	Added to last sentence of B. Live Load *... in accordance to Section 501 of NHDOT Standard Specifications for Road and Bridge Construction and as noted on the plans.* Added *C. Dead Load Deflection* *For longer spans, the Designer should be aware that the magnitude of the dead load deflection and pin-hole sag of modular prefabricated panel bridge systems (i.e., Acrow, Mabey) may become undesirable from a rideability stand point. For high speed and high volume roadways (Tier 1 and 2), the Designer shall decide whether the use of "camber panels" or "compression panels", which compensate for the expected pin-hole sag and dead load deflection, shall be required. If panels are required, a note shall be placed on the Contract Plans*	Designer shall be aware of possible sag and deflection for modular prefabricated panel bridge systems.
2/8/2016	Section 2.4 Replace all pages.	Section 2.4.2, page 2.4-5	Added link to "Tiers Viewer"	
2/8/2016	Section 2.6 Replace all pages.	Section 2.6.4, page 2.6-2, 3	Added 2nd paragrah in B. Concrete Form Liners Added Figure 2.6.4-1	Clarification on form liner typically used.
2/8/2016	Section 2.7 Replace all pages.	Section 2.7.5, page 2.7-6	Added: "*(less than 10-ft. [3-m])* " to the last paragraph.	Clarification.

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Date of Revision	Action	Location of Change	Revision Description	Background
		Section 2.7.7, page 2.7-23,24	Revised C. Channel Protection: Added paragraph: "*The designer shall determine the required d50 and depth of riprap in accordance to FHWA HEC-23 publication. The specific gravity (weighted average) of processed aggregates from quarries across the state is 2.69, which results in a density of 168 lb/cf (2.69 tonnes/m3)* ." Revised stone Items: **To:** • *Item 583, Riprap* *o Riprap shall be quarry stone of approved quality, hard, durable, subangular to angular in shape, resistant to weathering and free from structural defects such as weak seams and cracks.* *o Riprap is required for erosion protection of bridge structures in waterways, for active waterway channel slopes and bottoms, and for intermittent waterway channels where the Engineer determines riprap protection is required to resist expected high water flow velocities or volumes.* *o The designer shall specify a minimum d50 (median stone diameter) for the rock comprising the riprap to correspond with standard classes as noted in the Table 1 of the Specification 583 and FHWA HEC-23 publication.* *Item 583.1 Riprap, Class I* *Item 583.3 Riprap, Class III* *Item 583.5 Riprap, Class V* *Item 583.5 Riprap, Class VII* *Item 583.9 Riprap, Class IX* *Item 585.X, Stone Fill, Class X shall only be used for highway work such as roadway slope protection and at drainage outlets. This item is no longer used for channel protection.*	Clarification. The existing stone specification items were not correctly being chosen for channel protection required nor installed correctly. Typically designers were using Item 585.21 Stone Fill, Class B (Bridge) without consideration of the river velocity or scour countermeasures. At times Keyed Stone Fill was called for in the contract but just dropped along the river banks without keying in the stone. It was decided to revise the stone specifications to the following: 1) Replace existing Section 583, Riprap with the new Specification 583. (This is the only item that will be used for bridge channel protection.) 2) Keep Section 585, Stone Fill. (This item will be used for highway work such a slope protection and at drainage outlets.) 3) Remove Section 586, Placing Excavated Rock. (No one uses this item.) 4) Remove Section 587, Keyed Stone Fill. (Parts of this specification was combined with Item 583 to create one new item for channel protection.) For channel protection, the designer now determines the required stone diameter and depth of stone protection for the river/stream.

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			From: ~~• Item 583, Riprap~~ ~~o This item consists of field stone, quarry stone or rock fragments with 75% of the stone having a minimum volume range of 2 ft3 to 18 ft3.~~ ~~o This type of stone can be used if the channel protection design requires large stones.~~ ~~• Item 585.X, Stone Fill, Class X~~ ~~o This item consists of quarry stone or broken rock of hard, sound and durable quality. The stone and spalls are graded as to produce a dense fill with minimum voids.~~ ~~o Class A consist of irregular shape with 50% of mass having a minimum volume of 12 ft3.~~ ~~o Class B consists of irregular shape with 50% of mass having a minimum volume of 3 ft3.~~ ~~o Class C consists of clean durable fragments of uniform quality ledge rock graded as noted in the Standard Specifications.~~ ~~• Item 587.1, Keyed Stone Fill~~ ~~o This item consists of stone that is hard, durable, and angular in shape, having a gradation as noted in the Standard Specifications.~~ ~~o Keyed stone fill is difficult to place and shall only be used if design requires this type of stone size and placement.~~ Revised Figure 2.7.7-1: Revised stone item number to Item 583.X	

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Date of Revision	Action	Location of Change	Revision Description	Background
2/8/2016	Section 2.9 Replace all pages.	Section 2.9.1, page 2.9-1	Revised Slope Intercept Method Formula: **To:** Overpasses: L = SPAN + [(2 x slope) x (finished grade overpass to finished grade underpass)]/ cosine(skew) Stream Crossings: L = SPAN + [(2 x slope) x (finished grade overpass to top of stone elev. at face of abut.)]/ cosine(skew) Slope value examples = 1.5 for 1.5:1 slope, 2 for 2:1 slope skew angle = angle formed between a line perpendicular to the centerline of the roadway and the centerline of abutment. **From:** ~~o (Span) + [4 x (finished grade to finished grade) x (secant of skew angle)] for overpasses~~ ~~o (Span) + [3 x (streambed to finished grade) x (secant of skew angle)] for stream crossings~~ ~~The skew angle is the angle formed between a line perpendicular to the centerline of roadway and the face of abutment or edge of stream.~~	Clarificaiton.
2/8/2016	Appendix 2.2-A2 Replace all pages.	page 2.2-A2-1	Added: "*Drive Detour* " check box. Revised: "Signals" to "*Existing Signals* "	Clarification.
2/8/2016	Appendix 2.9-A1 Replace all pages.	page 2.9-A1-1, 2	Revised Slope-Intercept Method equation to the same revision as noted in Chapter 2, Section 2.9.1. Revised diagram.	Clarification.